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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/620,728	07/16/2003	Yasuhiro Mizohata	P/ 2699-25	9065

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EXAMINER

WILKINS III, HARRY D

ART UNIT	PAPER NUMBER
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1742

DATE MAILED: 11/09/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/620,728	Applicant(s) MIZOHATA ET AL.	
	Examiner Harry D. Wilkins, III	Art Unit 1742	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 October 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-38 is/are pending in the application.
- 4a) Of the above claim(s) 13-35 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-12 and 36-38 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 7/16/03 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>7/16/03, 9/22/03</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

1. Applicant's election without traverse of group I (claims 1-12 and 36-38) in the reply filed on 11 October 2005 is acknowledged.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by Starinshak et al (US 5,100,517).

Starinshak et al anticipate the invention as claimed. Starinshak et al teach (see abstract and figure) a plating apparatus including a plating section (10) for performing a plating process with the use of a plating liquid for plating a substrate with copper, the plating section having an insoluble anode (15), a copper dissolution tank (20) connected to the plating section for communication of the plating liquid with the plating section and accommodating therein a copper supply source (24) and a first circulation mechanism for circulating the plating liquid through the plating section and the copper dissolution tank. Starinshak et al teach (see col. 5, lines 52-61) that the copper supply source (24) was in various geometric shapes, including wire.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claim 2-4, 9-12 and 36-38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Starinshak et al (US 5,100,517).

The teachings of Starinshak et al are described above.

Regarding claim 2, Starinshak et al do not teach that the plating section included a plating liquid container capable of containing the plating liquid in a greater amount than the plating vessel and a second circulation mechanism for circulating the plating liquid through the plating vessel and the plating liquid container. The apparatus of Starinshak et al did include a plating vessel for containing the plating liquid to be brought into contact with the substrate.

However, it would have been obvious to one of ordinary skill in the art to have added another storage reservoir intermediate the copper dissolution tank and the plating vessel in the apparatus of Starinshak et al because the duplication of parts has been held to be obvious. See MPEP 2144.04.V1.8. The motivation to add another reservoir would be to have ensured that the electrolyte being fed to the plating cell had had sufficient time and agitation to become well mixed prior to contacting the workpiece.

Regarding claim 3, Starinshak et al do not teach that the copper supply source was a plurality of mesh members prepared by weaving a copper wire, where the mesh

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members were stacked one on another along a flow path of the plating liquid in the copper dissolution tank.

However, Starinshak et al do teach (see col. 5, lines 52-61) that the copper supply source (24) could be made in various geometric shapes.

Therefore, it would have been obvious to one of ordinary skill in the art to have made the copper supply source to be in any desired shape, such as a stack of mesh sheets. Changing the shape of the copper supply source was shown to be an obvious variation by the teachings of Starinshak et al.

Regarding claim 4, Starinshak et al do not teach that the copper dissolution tank included a cartridge accommodating the copper supply source. Starinshak et al do teach (see col. 5, lines 52-61) that the copper supply source (24) could be made in various geometric shapes and included a titanium basket (25). The copper dissolution tank included a plating liquid inlet port for introducing the plating liquid and a plating liquid outlet port for discharging the plating liquid.

However, it would have been obvious to one of ordinary skill in the art to have made the copper supply source to be in a removable cartridge in the copper dissolution tank because making a portion of a device separable has been held to be obvious. See MPEP 2144.04.V.C. The motivation to make the titanium basket of Starinshak et al removable (i.e.-formed as a cartridge) would have been in order to be able to easily replace the basket should fouling occur.

Regarding claim 9, Starinshak et al teach a single copper dissolution tank. However, it would have been obvious to one of ordinary skill in the art to have added a

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second copper dissolution tank so that while the titanium basket was being filled, the operation of the plating section could be carried out continuously without interruption. It would have been obvious to one of ordinary skill in the art to have used the weight of the titanium basket copper source to determine when the basket was empty, and to select the copper dissolution tank as necessary based on the weight (amount) of copper remaining in the basket.

Regarding claim 10, it would have been obvious to have used the copper supply source with the lowest weight first in order operate the device with a maximum of filled baskets at any time. By using the lowest basket first, a majority of the baskets will remain filled, such that the cell could operate a longer amount of time without having to have human intervention to fill the baskets.

Regarding claim 11, Starinshak et al do teach (see col. 5, lines 52-61) that the copper supply source (24) could be made in various geometric shapes.

Therefore, it would have been obvious to one of ordinary skill in the art to have made the copper supply source to be in any desired shape, such as a stack of mesh sheets. Changing the shape of the copper supply source was shown to be an obvious variation by the teachings of Starinshak et al.

Regarding claim 12, Starinshak et al do not teach that the copper dissolution tank included a cartridge accommodating the copper supply source. Starinshak et al do teach (see col. 5, lines 52-61) that the copper supply source (24) could be made in various geometric shapes and included a titanium basket (25). The copper dissolution

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tank included a plating liquid inlet port for introducing the plating liquid and a plating liquid outlet port for discharging the plating liquid.

However, it would have been obvious to one of ordinary skill in the art to have made the copper supply source to be in a removable cartridge in the copper dissolution tank because making a portion of a device separable has been held to be obvious. See MPEP 2144.04.V.C. The motivation to make the titanium basket of Starinshak et al removable (i.e.-formed as a cartridge) would have been in order to be able to easily replace the basket should fouling occur.

Regarding claim 36, Starinshak et al do not teach that the plating section included a plating liquid container capable of containing the plating liquid in a greater amount than the plating vessel and a second circulation mechanism for circulating the plating liquid through the plating vessel and the plating liquid container. The apparatus of Starinshak et al did include a plating vessel for containing the plating liquid to be brought into contact with the substrate.

However, it would have been obvious to one of ordinary skill in the art to have added another storage reservoir intermediate the copper dissolution tank and the plating vessel in the apparatus of Starinshak et al because the duplication of parts has been held to be obvious. See MPEP 2144.04.V1.8. The motivation to add another reservoir would be to have ensured that the electrolyte being fed to the plating cell had had sufficient time and agitation to become well mixed prior to contacting the workpiece.

Regarding the limitations about the copper supply source, Applicant admits that such limitations are met by a plurality of pipes (203) such as can be seen in figures 17

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and 18). Starinshak et al do teach (see col. 5, lines 52-61) that the copper supply source (24) could be made in various geometric shapes, and thus, it would have been obvious to one of ordinary skill in the art to have made the copper supply source to be pipes of copper.

Regarding claim 37, Starinshak et al do teach (see col. 5, lines 52-61) that the copper supply source (24) could be made in various geometric shapes, and thus, it would have been obvious to one of ordinary skill in the art to have made the copper supply source to be a pipe disposed generally parallel to the flow path of the plating liquid, and to include an inner pipe in addition to the outer pipe.

Regarding claim 38, Starinshak et al do teach (see col. 5, lines 52-61) that the copper supply source (24) could be made in various geometric shapes, including plates. For maximum contact, the plate would have been arranged so that its large surfaces were generally parallel to the flow path of the plating liquid.

6. Claims 5-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Starinshak et al (US 5,100,517) in view of Andricacos et al (US 5,352,350).

The teachings of Starinshak et al are described above.

Regarding claim 5, Starinshak et al do not teach (1) a replacement liquid supplying section for supplying a replacement liquid into the copper dissolution tank and (2) a control section which performs a control operation to circulate the plating liquid through the plating section and the copper dissolution tank when the plating process is performed in the plating section and to stop the circulation of the plating liquid and replace the plating liquid in the copper dissolution tank with the replacement liquid

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supplied from the replacement liquid supplying section after completion of the plating process in the plating section.

However, Andricacos et al teach (see col. 1, line 16 to col. 2, line 43) that plating liquids age with use and from time to time need to be completely dumped and a new bath fed to the system. Such a dumping a replacement process would have necessitated a replacement liquid supplying section for supplying a replacement liquid into the copper dissolution tank.

Therefore, it would have been obvious to one of ordinary skill in the art to have added a replacement liquid section as taught by Andricacos et al in order to replace the plating liquid when it had become aged, and unsuitable for continued use. It would have been obvious to one of ordinary skill in the art to have added a control section to control the replacement operation by stopping the circulation of the plating liquid and to replace the plating liquid in the copper dissolution tank.

Regarding claim 6, Starinshak et al teach (see figure and col. 7, lines 19-29) a water supplying section for supplying water liquid into the copper dissolution tank for maintaining the level of liquid in the system. It would have been obvious to one of ordinary skill in the art to have used this water feed to have rinsed the system when the first plating liquid is dumped to ensure that more of the impurities and byproducts that caused the aging of the plating bath were removed from the system.

Regarding claim 7, Starinshak et al do teach (see col. 5, lines 52-61) that the copper supply source (24) could be made in various geometric shapes. Therefore, it would have been obvious to one of ordinary skill in the art to have made the copper

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supply source to be in any desired shape, such as a stack of mesh sheets. Changing the shape of the copper supply source was shown to be an obvious variation by the teachings of Starinshak et al.

Regarding claim 8, Starinshak et al do not teach that the copper dissolution tank included a cartridge accommodating the copper supply source. Starinshak et al do teach (see col. 5, lines 52-61) that the copper supply source (24) could be made in various geometric shapes and included a titanium basket (25). The copper dissolution tank included a plating liquid inlet port for introducing the plating liquid and a plating liquid outlet port for discharging the plating liquid. However, it would have been obvious to one of ordinary skill in the art to have made the copper supply source to be in a removable cartridge in the copper dissolution tank because making a portion of a device separable has been held to be obvious. See MPEP 2144.04.V.C. The motivation to make the titanium basket of Starinshak et al removable (i.e.-formed as a cartridge) would have been in order to be able to easily replace the basket should fouling occur.


Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Harry D. Wilkins, III whose telephone number is 571-272-1251. The examiner can normally be reached on M-F 8:30am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy V. King can be reached on 571-272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Harry D Wilkins, III
Examiner
Art Unit 1742

hdw